

# An annotated checklist of the scale insects (Homoptera: Coccoidea) of Sweden

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The checklist gives a catalogue of the 72 species of scale insects so far found in Sweden and denotes from which of the 30 Swedish provinces the species were recorded. Listed are also 14 additional species found in Norway, Finland and/or Denmark but so far not in Sweden. The checklist thus gives a complete list of 86 species hitherto recorded from Fennoscandia and Denmark. Remarks to 57 species are given, containing notes on records and references to the literature. A concluding bibliography gives a complete list of works containing published records of Swedish, Norwegian, Finnish and Danish scale insects.

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## Introduction

After Linné (1758, 1761) and Dalman (1826), Tullgren (1906 a,b) was the first researcher who published noteworthy contributions to the knowledge of the systematics and distribution of Swedish scale insects (coccoids). Tullgren described 22 species of which ten were in-door species.

This article is the first modern survey of scale insects ever published in Sweden. However there was a "checklist" covering Fennoscandia including Denmark presented in 1991 (Sköld). From this "checklist", only published in a few copies, it was impossible to detect province records and the number of species that was collected in each country. The list contained 125 species including 50 indoor, greenhouse, species. Scale insects have been rather neglected in Sweden and there is little new information published on them in this country. In the present checklist 72 species are listed from Sweden. Scale insects that occur only on indoor plants or in greenhouses are not mentioned in the list. This list gives a complete survey of species so far recorded from Sweden. Also species from Norway, Denmark and Fin-

land are mentioned, but not treated in detail. The total number of scale insect species found in Fennoscandia and Denmark is now 86. A glance at the list of the Swedish part shows that the number of species so far known from the various provinces are conspicuously unequal. Thus 40 species were found in Uppland but only 3 in Härjedalen and 2 in Jämtland, Åsele and Lycksele Lappmark respectively. In all provinces except Uppland, Skåne and Småland the number of species recorded is less than 20. Clearly this does not reflect the real facts. Most provinces have been more or less neglected and much work still has to be carried out before our knowledge of the distribution of coccoids in Sweden is complete. The frequency of species new to Sweden since 1900 is shown in Fig. 1. There was a steady increase in number of species between 1930 and 1960 but after 1960 this trend has been broken. This is not indicating that the fauna is completely known, and the total number of species is probably more than one hundred. The figure for Central Europe is 233 and for the Euro-Siberian subregion of the

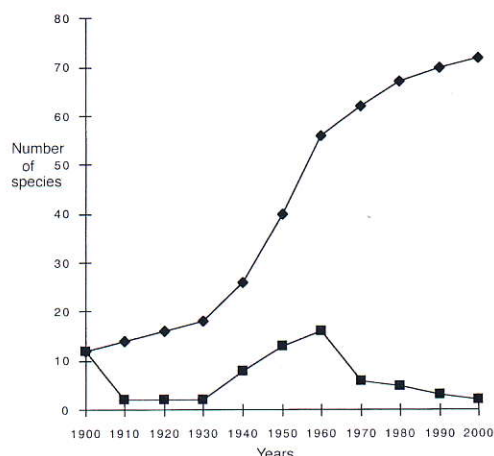


Fig. 1. Frequency of scale-insects new to Sweden, 1900-2000, where (■) is the number per 10 year period and (◆) is the cumulative total.

Antalet insamlade nya sköldlusarter i Sverige per 10-års period (■) samt det kumulativa totalantalet (◆) under åren 1900-2000.

Palearctic region 257 (Kosztarab & Kozár 1988, Kozár 1995). The largest number of species in Sweden are found in the families Pseudococcidae and Coccidae. The Euro-Siberian subregion in Palaeartis is also characterized by a high number of species in these families (Kozár & Drozdják 1986). In the worldfauna the families Diaspididae and Pseudococcidae have the highest species numbers (Ben-Dov et al. 2000).

Families are treated in phylogenetic order, but genera and species in alphabetical order. The following superfamilies and families are represented in Sweden: superfamily Orthezioidea (primitive coccoids), families Margarodidae (giant scales) and Ortheziidae (ensign scales), superfamily Coccoidea (advanced coccoids) families Pseudococcidae (mealybugs), Eriococcidae (felt scales), Cryptococcidae (bark-crevice scales), Kermesidae (gall-like scales), Asterolecaniidae (pit scales), Coccidae (soft scales) and Diaspididae (armored scales).

A bibliography with important international literature and works containing published records of Swedish, Norwegian, Finnish and Danish scale insects complete the check-list.

## Material studied

The present list is the result of research into previously published literature, my own collection and other collections available. I have investigated collections from the following institutes: The Entomological Museum of the Zoological Institute, Lund; The Museum of Natural History, Gothenburg; The Department of Entomology, The Swedish University of Agricultural Sciences, Uppsala; The Zoological Museum, University of Copenhagen, Denmark and The Natural History Museum, London, U.K. The main published sources of information of records from non-Swedish countries are: for Denmark (Kozarzhevskaya & Reitzel 1975, 1976, 1977), Finland (Huldén & Heikinheimo 1984, Huldén 1985 a and b, Silfverberg 1986, Vikberg 1991) and for Norway (Fjeldalen 1996).

## Results

The Swedish material includes 9 families, 45 genera and 72 species. The figures in brackets are the total numbers from Fennoscandia and Denmark. Family representation is as follows: Margarodidae 3 genera, 3 species (4 genera, 4 species); Ortheziidae 4 genera, 5 species (4 genera, 5 species); Pseudococcidae 15 genera, 27 species (16 genera, 29 species); Eriococcidae 4 genera, 8 species (4 genera, 10 species); Cryptococcidae 1 genus, 1 species (1 genus, 1 species);

Country/ Region	Number of families	Number of genera	Number of species
Sweden	9	45	72
Denmark	9	30	37
Finland	7	22	29
Norway	6	19	25
Fennoscandia and Denmark	9	49	86
Central Europe	12	95	233

Tab. 1. Comparisons of families, genera and species number of Coccoidea in Sweden, Denmark, Finland, Norway, Fennoscandia and Denmark and Central Europe.

Jämförelser mellan antalet familjer, släkten och arter i Sverige, Danmark, Finland, Norge, Fennoskandien och Danmark samt Centraleuropa.



Kermesidae 1 genus, 1 species (1 genus, 1 species); Asterolecaniidae 2 genera, 2 species (2 genera, 2 species); Coccidae 9 genera, 16 species (9 genera, 20 species); Diaspididae 6 genera, 9 species (8 genera, 14 species). Pseudococcidae and Coccidae have the highest number of species. This is in accordance with the number of species in the Euro-Siberian subregion of the Palearctic region (Kozár 1995). Tab. 1 gives a survey of families, genera and species numbers in Sweden, Denmark, Finland, Norway, Fennoscandia and Denmark and Central Europe.

Provincial records in Sweden (SE) are abbreviated according to Fauna Entomologica Scandinavica (Fig. 2, next page) and the Nordic countries are abbreviated as follows, Denmark (DK), Finland (SF) and Norway (NO).

The nomenclature follows Kosztarab & Kozár (1988), Ben-Dov (1993, 1994), Kozár (1998) and Ben-Dov et al. (2000).

#### Superfam. Orthezioidea

##### Fam. Margarodidae

##### *Matsococcus* Cockerell, 1909

1. *matsumurae* (Kuwana, 1905) – SE: To; - SF.

##### *Porphyrophora* Brandt, 1833

2. *polonica* (Linnaeus, 1758) – SE: Sk; - DK

##### *Steingelia* Nasonov, 1908

3. *gorodetskia* Nasonov, 1908 – SE: Ly, To.

##### *Xylococcus* Löw, 1883

4. *filiferus* Löw, 1883 – DK.

##### Fam. Ortheziidae

##### *Arctorthezia* Cockerell, 1902

5. *cataphracta* (Olafsen, 1772) – SE: Ha, Sm, Vg, Vr-To; - SF; - NO.

##### *Newsteadia* Green 1902

6. *floccosa* (De Geer, 1778) – SE: Sk-Go, Ög-Bo, Nä-Ly, Lu; - DK; - SF.

##### *Orthezia* Bosc d'Antic, 1784

7. *urticae* (Linnaeus, 1758) – SE: Sm, Go, Ög, Up; - DK; - SF.

##### *Ortheziola* Šulc, 1894

8. *britannica* Kozár & Miller, 2000 – SE: Sm, ÖI, Ög.

9. *vejdovskyi* Šulc, 1894 – SE: Go.

#### Superfam. Coccoidea

##### Fam. Pseudococcidae

##### *Atrococcus* Goux, 1941

10. *achilleae* (Kiritchenko, 1936) – SE: Up.

11. *cracens* Williams, 1962 – SE: Sm, Ög, Up.

12. *paludinus* (Green, 1921) – SE: Sm-Go, Vg, Ds, Up, Vb; - NO.

##### *Balanococcus* Williams, 1962

13. *borantyskii* Williams, 1962 – SE: ÖI.

##### *Brevennia* Goux, 1940

14. *pulveraria* (Newstead, 1892) – SE: Go, Up.

##### *Chnaurococcus* Ferris, 1950

15. *subterraneus* (Newstead, 1893) – SE: Sk, Sm, ÖI; - DK.

##### *Coccura* Šulc, 1908

16. *comari* (Künnow, 1880) – SE: Go; - SF.

##### *Dysmicoccus* Ferris, 1950

17. *walkeri* (Newstead, 1891) – SE: Go.

##### *Euripersia* Borchsenius, 1948

18. *europa* (Newstead, 1897) – SE: Sk.

19. *tomlini* (Newstead, 1892) – SE: Sm, Ög; - DK.

##### *Heliococcus* Šulc, 1912

20. *bohemicus* Šulc, 1912 – SE: Sö, Up, Pi-To; - SF.

21. *radicicola* Goux, 1931. – SE: Sö, Up.

##### *Peliococcus* Borchsenius, 1948

22. *balteatus* (Green, 1928) – SE: Up.

23. *manifectus* Borchsenius, 1949 – SE: ÖI.

##### *Phenacoccus* Cockerell, 1893

24. *aceris* (Signoret, 1875) – SE: Sk, Sm, ÖI, Ög, Vg, Sö, Up, Dr, Nb, Lu; - DK; - SF; - NO.

25. *hordei* (Lindeman, 1886) – SE: Sm; - SF.

26. *interruptus* Green, 1923 – SE: Sk, Vs.

27. *picaea* (Löw, 1883) – SE: Sm, Ög, Ds, Up, Hr, Vb. - SF; - NO.

##### *Planococcus* Ferris, 1950

28. *vovae* (Nassonov, 1908) – SE: Ån; - SF.

##### *Puto* Signoret, 1875

29. *pilosellae* (Šulc, 1898) – SE: ÖI, Go.

##### *Rhizoecus* Künckel d'Herculais, 1878

30. *albidus* Goux, 1942 – SE: BI, Sm, ÖI, Ög, Ds.

##### *Ripersia* Signoret, 1875

31. *corynephori* Signoret, 1875 – DK.

##### *Spinococcus* Borchsenius, 1948

32. *calluneti* (Lindinger, 1912) – SE: Sk, Sm, Ög, Sö-Vs, Hs; - DK; - NO.

##### *Trionymus* Berg, 1899

33. *dactylis* Green, 1925 – SE: Sm.

34. *perrisii* (Signoret, 1875) – DK.

35. *phalaridis* Green, 1925 – SE: Up.

36. *radicum* (Newstead, 1895). – SE: Sm.

37. *thulensis* Green, 1931 – SE: Up.

38. *tomlini* Green, 1925 – SE: Vg, Nä, Up; - DK.

#### Fam. Eriococcidae

##### *Acanthococcus* Signoret, 1875

39. *baldonensis* Rasina, 1966 – SF.

40. *devoniensis* (Green, 1896) – SE: Sk, Ha, Sm, Vg, Ds; - DK.

41. *greeni* (Newstead, 1898) – SE: Sk, Up, Vr, Dr.

42. *timidus* (Huldén, 1985) – SF.

43. *uvaeursi* (Linnaeus, 1761) – SE: Up.

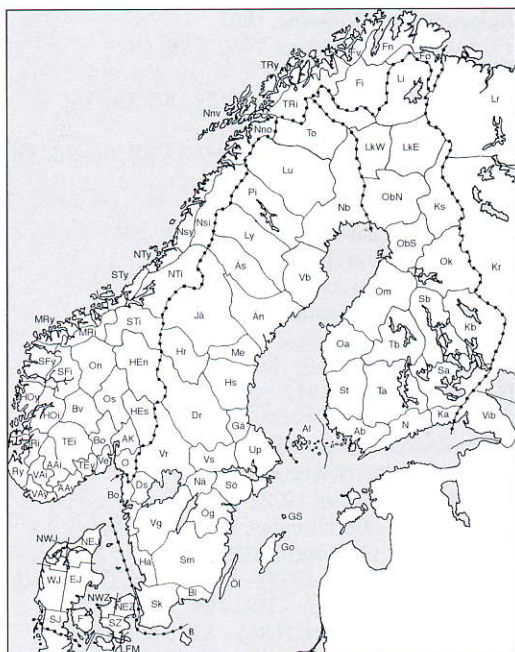


Fig. 2. The faunistic provinces of Sweden.

## Sveriges faunistiska provinser.

Sk = Skåne	Vr = Värmland
Bl = Blekinge	Dr = Dalarna
Ha = Halland	Gä = Gästrikland
Sm = Småland	Hs = Hälsningland
Öl = Öland	Me = Medelpad
Go = Gotland	Hr = Härjedalen
GS = Gotska Sandön	Jä = Jämtland
Ög = Östergötland	Ån = Ångermanland
Vg = Västergötland	Vb = Västerbotten
Bo = Bohuslän	Nb = Norrbotten
Ds = Dalsland	Ås = Åsele lappmark
Nä = Närke	Ly = Lycksele lappmark
Sö = Södermanland	Pi = Pite lappmark
Up = Uppland	Lu = Lule lappmark
Vs = Västmanland	To = Torne lappmark

**Gossyparia Signoret, 1875**

44. *spuria* (Modeer, 1778) – SE: Sk, Sö-Vs; - DK; - SF; - NO.

**Pseudochermes Nitsche, 1895**

45. *fraxini* (Kaltenbach, 1860) – SE: Sk-Go, Vg, Bo, Sö-Vs; - DK; - SF; - NO.

**Rhizococcus Signoret, 1875**

46. *agropyri* Borchsenius, 1949 – SE: Up.

47. *insignis* Newstead, 1891 – SE: Sk, Bl, Vg, Nä, Up, Vr, Hs; - DK.

48. *pseudinsignis* Green, 1921 – SE: Dr.

**Fam. Cryptococcidae****Cryptococcus Douglas, 1870**

49. *fagisuga* Lindinger, 1936 – SE: Sk-Go, Vg, Bo, Up, Vs; -DK.

**Fam. Kermesidae****Kermes Boitard, 1828**

50. *quercus* (Linnaeus, 1758) – SE: Sk, Bl, Öl, Ög, Up, Vs; - DK; - SF.

**Fam. Asterolecaniidae****Asterodiapsis Signoret, 1877**

51. *variolosa* Ratzeburg, 1870 – SE: Sk, Sm, Öl, Up, Gä; -DK; - NO.

**Planchonia Signoret, 1870**

52. *arabidis* Signoret, 1877 – SE: Sk, Öl, Go.

**Fam. Coccidae****Eriopeltis Signoret, 1872**

53. *festucae* (Fonscolombe, 1834) – SE: Up; -DK; - SF.

54. *lichtensteni* Signoret, 1876 – SE: Sm, Sö, Up; - DK; - NO; - SF.

55. *stammeri* Schmutterer, 1952 – SE: Up; - DK.

**Eulecanium Cockerell, 1893**

56. *ciliatum* (Douglas, 1891) – SE: Up.

57. *douglasi* (Šulc, 1895) – SE: Sm; - SF.

58. *franconicum* (Lindinger, 1912) – SE: Hs; - SF.

59. *sericeum* (Lindinger, 1906) – NO.

60. *tiliae* (Linnaeus, 1758) – SE: Sk, Ha, Sm, Vg, Up, Vr, Dr; - DK; - NO.

**Lecanopsis Targioni-Tozzetti, 1868**

61. *formicarum* Newstead, 1893 – SE: Sk; - DK.

**Luzulaspis Cockerell, 1902**

62. *luzulae* (Dufour, 1864) – SF.

63. *scotica* Green, 1926 – SE: Go, Sö.

**Palaeolecanium Šulc, 1908**

64. *bituberculatum* Signoret, 1874 – SE: Ha; - DK.

**Parafairmairia Cockerell, 1899**

65. *gracilis* Green, 1916 – SE: Ha, Go, Up; - DK.

**Parthenolecanium Šulc, 1908**

66. *corni* (Buché, 1844) – SE: Sk-Sm, Go, Ög-Bo, Nä-Hs; - DK; - SF; - NO.

67. *fletcheri* (Cockerell, 1893) – SE: Sk; - DK.

68. *persicae* (Fabricius, 1776) – DK.

69. *pomeranicum* (Kawecki, 1954) – SE: Sk; - DK; - NO.

**Physokermes Targioni-Tozzetti, 1868**

70. *hemicryphus* (Dalman, 1825) – SE: Sk, Vg, Up; - SF.



71. *piceae* (Schränk, 1801) – DK; - SF.

***Pulvinaria* Targioni-Tozzetti, 1866**

72. *vitis* (Linnaeus, 1758) – SE: Sk, Sm, Öl, Ög, Vg, Sö, Up, Me, Nb; - DK; - SF; - NO.

**Fam. Diaspididae**

***Aulacaspis* Cockerell, 1893**

73. *rosae* (Bouché, 1833) – SE: Sö, Up, Vr; - DK; - SF; - NO.

***Carulaspis* MacGillivray, 1921**

74. *juniperi* (Bouché, 1851) – NO.

***Chionaspis* Signoret, 1869**

75. *salicis* (Linnaeus, 1758) – SE: Sk-Bo, Sö-Vr, Dr-Me, Än, Vb; - DK; - SF; - NO.

***Diaspidiotus* Berlese & Leonardi, 1896**

76. *bavaricus* (Lindinger, 1912) – SE: Sk, Sm, Öl, Up; - SF; - NO.

77. *lenticularis* (Lindinger, 1912) – DK.

78. *ostreaeformis* (Curtis, 1843) – SE: Up; - SF; - NO.

79. *perniciosus* (Comstock, 1881) – DK.

80. *zonatus* (Frauenfeld, 1868) – SE: Sk.

***Dynaspidiotus* Thiem et Gernek, 1934**

81. *abietis* (Schränk, 1776) – SE: Sk, Go, Ög, Nä-Up, Vr; - NO.

***Epidiaspis* Cockerell, 1899**

82. *leperii* (Signoret, 1869) – NO.

***Lepidosaphes* Shimer, 1868**

83. *newsteadii* (Sulc, 1895) – NO.

84. *ulmi* (Linnaeus, 1758) – SE: Sk-Ds, Sö-Vr, Gä, Me; - DK; - SF; - NO.

***Leucaspis* Signoret, 1869**

85. *loewi* Colvée, 1882 – SE: Sk, Bl, Sm-GS, Ög-Bo, Sö-Vr; - DK; - NO.

86. *pini* (Hartig, 1839) – SE: Sm-Go; - NO.

**Remarks on particularly the Swedish species (numbers refer to the figures in the checklist)**

1. *M. matsumurae*. Syn. *pini* (Ossiannilsson 1959, 1972). The only Swedish record is from To, Abisko 18.7 1955 and 11.7 1964 (Ossiannilsson 1959, 1972).

2. *P. polonica*. Found in Sk (Dahlbom 1837). Not found since the Linnean time. Extinct in Sweden? Found in Denmark according to Kozár (1998).

3. *S. gorodetskia*. Only two finds in Sweden, To, Abisko 19.7 1955 and Ly, Ammarnäsfjällen 26.6 1972 (Ossiannilsson 1959, 1985).

4. *X. filiferus*. According to Kozár (1998).

8. *O. vej dovskyi*. Perhaps *O. britannica* (see below)? I haven't refound this specimen in the collections from the Swedish museums.

9. *O. britannica*. Up to now only finds from the U.K. (Kozár & Miller 2000). All investigated Swedish specimens from the entomological museums are

*O. britannica*. Only found in xerothermic habitats (Ossiannilsson 1984).

10. *A. achilleae*. One old find from Up, Ultuna, Uppsala 1.8 1957 (det. Ossiannilsson). See Gertsson (1997).

13. *B. boratynskii*. One find from Öl, Vickelby, L:a Vickelby 20.7 1950 (Ossiannilsson 1985).

14. *B. pulveraria*. Syn. *Heterococcus variabilis* (Ossiannilsson 1959) and *H. nudus* (Kosztarab & Kozár, 1988).

16. *C. comari*. Only from Go, Öja, Olleifs 8.8 1969 (Ossiannilsson 1985).

17. *D. walkeri*. Only from Go, Fårö, 26.7 1999 (Gertsson 2000).

18. *E. europea*. Only from Sk, Stenshuvud, 11.6 1983 (Gertsson 2000).

19. *E. tomlini*. Finds from Ög, N. Finnö, Tyrislöt, 23.7 1973 and Sm, Bergkvara 8.8 1976. See Gertsson (1997, 2000).

20. *H. bohemicus*. Syn. *H. hystrix* (Ossiannilsson 1951). One find from To, Abisko 6.8 1965, was originally identified as *H. osborni* (Ossiannilsson 1972), but it belongs to *bohemicus* Gertsson 2000).

21. *H. radiculicola*. A rare species found in Sö, Nacka, Erstavik 14.9 1947 (Ossiannilsson 1959).

22. *P. balteatus*. This rare species was found in Up, Gamla Upsala 2.8 1952 (Ossiannilsson 1959).

23. *P. manifestus*. Latest found from Öl, Resmo 14.7 1950 (Ossiannilsson 1959).

25. *P. hordei*. One find from Sm, Bergkvara, 2.6 1973 (Gertsson 2000).

26. *P. interruptus*. See Ossiannilsson (1985).

28. *P. vovae*. Only one find from Än, Omneberget, 18. 7 1981 (Gertsson 2000).

29. *P. pilosellae*. Previously reported under the invalid name *Ceroputo balachowskyi* (Ossiannilsson 1959).

30. *R. albidus*. One find, Ds, Dals-Ed, Hökesäter 28.7 1973 was reported as *halophilus*. A misidentification. See Sköld (1991).

31. *R. corynephorii*. A very old find, 1910, from Denmark. It is a question whether this mealybug was this species or not. See also Kosztarab & Kozár (1988) and Kozarzhevskaya & Reitzel (1975).

33. *T. dactylis*. Only one find from Sm, Söderåkra, Örrevet 1.9 1973 (Gertsson 2000).

34. *T. perrissii*. See Kozarzhevskaya & Reitzel (1975).

35. *T. phalaridis*. Latest found from Up, Ultuna, Fyrisån 21.10 1949 (Ossiannilsson 1951).

36. *T. radicum*. Only find from Sm, Bergkvara, St. Gettnabo 1.9 1973 (Gertsson 2000).

37. *T. thulensis*. See Ossiannilsson (1985).

38. *T. tomlini*. See Ossiannilsson (1985).

39. *A. baldonensis*. See Vikberg (1991).
42. *A. timidus*. See Huldén (1985).
43. *A. uvaeursi*. A rare species only found in Up, Experimentalfältet 1.8 1920 and 3.7 1949 (Ossiannilsson 1951).
46. *R. agropyri*. One find from Up, Uppsala, Ultuna 21.6 1953 (Ossiannilsson 1959).
48. *R. pseudinsignis*. Only one find from Dr, Leksand 7.7 1955 (Ossiannilsson 1985).
53. *E. festucae*. See Ossiannilsson (1985).
55. *E. stammeri*. See Ossiannilsson (1985).
56. *E. ciliatum*. Latest found from Up, Uppsala, Håga 30.5 1954 (Ossiannilsson 1959).
57. *E. douglasi*. One find from Sm, Växjö, N. Åreda 8.6 1981 (Gertsson 1997).
58. *E. franconicum*. See Ossiannilsson (1985).
59. *E. sericeum*. See Fjeldsdalen (1996).
61. *L. formicarum*. Found in Sk, Råå 22. 5 1961 (Ossiannilsson 1985).
62. *L. luzulae*. See Huldén (1985 a).
63. *L. scotica*. Two finds from Sö, Åby 14. 8 1920 (Ossiannilsson 1951) and from Go, Roma 10. 7 1952 (Ossiannilsson 1959).
64. *P. bituberculatum*. From Ha last mentioned by Tullgren (1906 a). The find from Denmark is very old too, 1921 (Kozarzhevskaya & Reitzel 1975).
65. *P. gracilis*. A rare western-Palearctic species. Only finds from three provinces (Andersson, 1959, Ossiannilsson 1959).
67. *P. fletcheri*. Only one old find from Sk, Malmö 20. 8 1949 (Ossiannilsson 1951, 1959).
68. *P. persicae*. See Kozarzhevskaya & Reitzel (1975).
69. *P. pomeranicum*. One old find from Sk, Limhamn 20.8 1949 (Ossiannilsson 1951, 1959), recently refound in Sk, Alnarp 6.7 1997 (Gertsson 2000).
70. *P. hemicyphus*. See Ossiannilsson (1951).
71. *P. piceae* ? May refer to *P. hemicyphus*. Species identification based on females is very difficult due to the short time available to collect teneral females (Kosztarab 1996).
74. *C. juniperi*. Found in Norway according to Kozár (1998).
77. *D. lenticularis*. Only mentioned in Kosztarab & Kozár (1988) as discovered in DK.
78. *D. ostreaeformis*. Two old finds, 1925 and 1926 on fruit trees, Stockholm (Ossiannilsson 1951).
79. *D. perniciosus*. See Kozarzhevskaya & Reitzel (1975).
80. *D. zonatus*. One old find on oak from Sk (Ander 1946).
82. *E. leperii*. An old find, 1928, from Norway (Fjeldsdalen 1996).
83. *L. newsteadii*. See Williams & Edland (1985).

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### Sammanfattning

Denna förteckning över den svenska sköldlusfaunan omfattar 72 hittills påträffade arter. Landskapsutbredning för de svenska fynden samt förekomst i Danmark, Norge och Finland redovisas. Totalt har 86 arter noterats i de fyra nordiska länderna. 14 av dessa arter är ej funna i Sverige. Kommentarer till arter som är sällsynta eller endast påträffats på ett fåtal lokaler och/eller är av äldre datum presenteras. I den avslutande bibliografin finns viktig internationell sköldluslitteratur samt litteratur från de ovan nämnda länderna upptagen.